

## REMARKS

This application has been carefully reviewed in light of the Office Action dated April 21, 2004. Claims 1 to 10 are currently pending in the application, of which Claims 1, 2 and 7 are independent. Reconsideration and further examination are respectfully requested.

Claims 1 to 10 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,795,082 (Shimada). Reconsideration and withdrawal of the rejections are respectfully requested.

The present invention concerns quantization of input image data of one pixel to multi-value data with three or more levels. According to the invention, as seen in Fig. 6A, low density data is quantized into 3 levels (level 0 for gradation values between 0-21 and 200-255, level 1 for gradation values between 21-62 and 62-170, and level 2 for gradation values between 170-200), and as seen in Fig. 6B, high density data is quantized into 3 levels (level 0 for gradation values 0-62, level 1 for gradation values 62-200, and level 2 for gradation values 200-255). Thus, for devices that print with both low density and high density ink, quantization for the low density data is performed in the three levels (0, 1 and 2 of Fig. 6A), and quantization for the high density data is likewise performed in the three levels (0, 1 and 2 of Fig. 6B). Accordingly, as seen in Figure 7, the present invention is capable of printing one pixel with 5 gradation levels of dots when both the first and second recording heads are used. That is, one pixel can be recorded with five levels of dots as follows: 1) no dot (level 0 for both low and high density), 2) level 1 for low density, 3) level 2 for low density, 4) level 1 for high density, and 5) level 2 for high density. As a result, a combination of both a high density dot and a low density dot can be printed on the

same pixel so that a higher quality image is printed as compared to conventional processes that print only either a low density dot, a high density dot, or no dot on a single pixel.

Referring specifically to the claims, independent Claim 1 is a quantization method in which quantization processing is applied to data for first and second recording means which record input image data in a plurality of gradations which belong to each of different gradations in substantially the same hue, comprising the steps of inputting multi-value level image data, a first quantization step of performing quantization of the image data input for the first recording means to data with 3 or more levels which are lower than that of the input image data, the first quantization step performing the quantization by conducting error correction, and a second quantization step of performing quantization of the image data input for the second recording means to data with 3 or more levels which are lower than that of the input image data, the second quantization step performing the quantization without conducting error correction, wherein at least one of the first and second quantization steps performs quantization of the input image data of one pixel to multi-value data with 3 or more levels, so that the corresponding one of the first and second recording means may record the image in a plurality of gradations, wherein in the first and second quantization steps, one pixel of the image data is quantized so as to be able to record one pixel with 5 or more levels and upon recording with a predetermined level of the 5 or more levels, both of the first recording means and the second recording means are used, and wherein the first recording means records the image with lower density recording material than that used by the second recording means.

Amended independent Claims 2 and 7 are apparatus and recording-medium claims, respectively, that substantially correspond to Claim 1.

The applied art is not seen to disclose or to suggest the features of Claims 1, 2 and 7, and in particular, is not seen to disclose or to suggest at least the feature of first and second quantization steps performing quantization of input image data of one pixel to multi-value data with 3 or more levels which are lower than that of an input image, with the first quantization step being performed with error correction and the second quantization step being performed without error correction, and wherein in the first and second quantization steps, one pixel of the image data is quantized so as to be able to record one pixel with 5 or more levels and upon recording with a predetermined level of the 5 or more levels, both of the first recording means and the second recording means are used.

Shimada is merely seen to disclose performing quantization of low density data (S140 of Fig. 12) with two levels (on/off state, (i.e., no dot or dot-on)) and quantization of high density data (S120 of Fig. 12) with two levels (on/off state (i.e., no dot or dot-on)). Thus, for any one pixel, Shimada merely prints with three levels; no-dot, low density dot-on, or high density dot-on. This is exemplified by Figures 18a to 18h, where it can be clearly seen that each pixel of the 5 x 5 grid is printed with one of the three levels (i.e., each pixel is printed with either no dot, a low density dot, or a high density dot, based on the on/off states). In contrast, as described at page 24, lines 11 to 26 of the subject specification, a mixture of high/low density dots are used to express certain gradation values (e.g., 62-200), thus providing for the 5 levels of gradation for recording due to the 3 levels of quantization for each of the first and second quantization steps. In sum, Shimada's 2 levels of quantization for each density results in 3 gradation levels, while the present invention's 3 levels of quantization for each density results in 5 gradation levels.

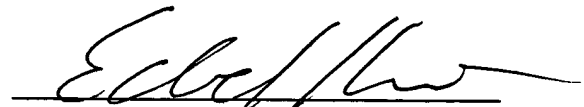
Accordingly, Shimada is not seen to disclose or to suggest at least the feature of first and second quantization steps performing quantization of input image data of one pixel to multi-value data with 3 or more levels which are lower than that of an input image, with the first quantization step being performed with error correction and the second quantization step being performed without error correction, and wherein in the first and second quantization steps, one pixel of the image data is quantized so as to be able to record one pixel with 5 or more levels and upon recording with a predetermined level of the 5 or more levels, both of the first recording means and the second recording means are used.

In view of the foregoing deficiencies of the applied art, all of Claims 1 to 10 are believed to be allowable.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa,  
California office at (714) 540-8700. All correspondence should continue to be directed to  
our below-listed address.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Edward A. Kmett", written over a horizontal line.

Attorney for Applicants  
Edward A. Kmett  
Registration No. 42,746

FITZPATRICK, CELLA, HARPER & SCINTO  
30 Rockefeller Plaza  
New York, New York 10112-2200  
Facsimile: (212) 218-2200

CA\_MAIN 83484v1